

APPENDIX

Partial translation of Fumiyoshi

Example 1: A convex meniscus lens with spherical surfaces of outer diameter 21.0mmphi, maximum light effective aperture 20.0mmphi, 1.55mm of peripheral thickness, and thickness difference of 0.8mm was manufactured using equipment as shown in the above Fig. 1 as follows.

Dense flint glass with a transition point temperature of 480 degrees C and a strain point temperature of 373 degrees C was flowed from a nozzle made from platinum of 15mm of inner diameter phi while stabilizing at the viscosity of $10^{4.7}$ Poises.

Each diameter of the mold component 12 and 12' was set to 21.0mmphi, and amounts of projection at the tip of each of slot formation rings 18 and 18' were set to 0.5mm. This mold component used was made with a nickel based super-heat-resistant alloy (Inconel 718) as substrate material and had a coating of the AlN ceramics, 0.8 micrometers in thickness on the molding surface.

With respect to the conditions of pressing and cooling, mold component temperature (T1) at the time pressing starts were set to those shown in Table 1, pressing pressure was 20 kg/cm², and pressing time was set for 18 seconds. Although mold component temperature was controlled at constant in experiment No. 1-4 until the time of glass hardening (at the time of release from mold), in experiment No. 5-8, heating of mold was stopped immediately after start of pressing, and the mold component temperature (T2) at the time of release from a mold being those shown in Table 1.

100 optical components per each condition were obtained. The surface accuracy of both sides of the obtained lens was measured, and products of which a stigma irregularities and spherical surface accuracy were less than three Newton for each surface were judged to be an excellent article. The result is shown in Table 1.

Experi- ment No.	T1 (°C)	T2 (°C)	Ratio of good articles (%)
	Mold component 12/ Mold component 12'	Mold component 12/ Mold component 12'	Left convex surface/ Right concave surface
1	410/410	410/410	41/54
2	430/400	430/400	100/0
3	400/420	400/420	0/100
4	370/410	370/410	0/100
5	430/430	404/398	64/84
6	440/410	412/394	100/37
7	380/420	359/388	49/100
8	400/400	377/370	22/16

The above-mentioned experiment No. 1, and 5 and 8 are outside the scope of this invention, and they are comparative examples.

The above results show that the accuracy of the surface at the side of high temperature is maintained in good condition, when the difference of temperature between components 12 and 12' is 10 degrees C or more at the time of glass hardening (at the time of release from mold). That is, defects at the time of cooling were concentrated on the lower temperature surface. This defect is divided to the both sides in the comparative examples, and ratio of good articles for both sides are not enough.